Math 1030, Homework Activity #3, Summer 2014 Name KEY
Sections 4.2, 4.3

Instructions: Complete the following problems. You may work alone or in a group. Do not just copy answers from a group member, but be sure that you understand the problem. Similar questions will appear on exams. You may be asked to explain or present the answers to the class. This assignment is due at the end of the class period.

1. Solve each of the equations below by both substitution and by elimination. Verify that the solution obtained by both methods is the same. Determine if the system is consistent or inconsistent, and if applicable, independent or dependent.

a. $\begin{cases} x - y = -4 \\ 3x + y = -4 \end{cases}$ (-2, 2)

S. $x+4=y \Rightarrow 3x+(x+4)=-4 \Rightarrow 4x+4=-4 \Rightarrow 4x=-8 \Rightarrow x=-2 \Rightarrow -2+4=y \Rightarrow y=2$

E. $\Rightarrow 4x=-8 \quad x=-2 \Rightarrow -2-y=-4 \Rightarrow y=2$

b. $\begin{cases} y = \frac{1}{2}x - 5 \\ y = -\frac{3}{4}x - 10 \end{cases}$ (-4, -7)

S. $\left(\frac{1}{2}x-5=-\frac{3}{4}x-10\right)4 \Rightarrow 2x-20=-3x-40 \Rightarrow 5x=-20 \Rightarrow x=-4$, $y=\frac{1}{2}(-4)-5=-7$

E. $-4=-\frac{1}{2}x+5$, $y=-\frac{3}{4}x-10$ $\Rightarrow 0=-\frac{5}{4}x-5 \Rightarrow 5=-\frac{5}{4}x \Rightarrow x=-4 \Rightarrow y=\frac{1}{2}(-4)-5=-7$

c. $\begin{cases} x + 3y = -12 \\ y = 3x \end{cases}$ $\left(-\frac{6}{5}, -\frac{18}{5}\right)$

S. $x+3(3x)=-12 \Rightarrow 10x=-12 \Rightarrow x=-\frac{6}{5}$ $y=3\left(-\frac{6}{5}\right) \Rightarrow y=-\frac{18}{5}$

next page for e.

d. $\begin{cases} \frac{x}{4}+\frac{y}{2}=\frac{3}{8} & \times 8 \\ x-\frac{y}{3}=\frac{1}{3} & \times 3 \end{cases}$ $\left(\frac{1}{2}, \frac{1}{2}\right)$

$\rightarrow \begin{cases} 2x+4y=3 \\ 3x-y=1 \Rightarrow y=3x-1 \end{cases}$ $2x+4(3x-1)=3 \Rightarrow 14x-4=3 \Rightarrow 14x=7 \Rightarrow x=\frac{1}{2}$

$y=3(\frac{1}{2})-1=\frac{1}{2}$

next page for e.

e. $\begin{cases} 2x + 5y = 15 \\ -6x - 15y = -45 \end{cases}$ $\times 3$

E. $\begin{cases} 6x+15y=45 \\ -6x-15y=-45 \end{cases}$ $0=0$ dependent $y=-\frac{2}{5}x+3$

next page for s.

f. $\begin{cases} 2x + y = -4 \\ 3x + 5y = 29 \end{cases}$ (-7, 10)

S. $y=-2x-4 \Rightarrow y=-2(-7)-4=14-4=10$

$3x+5(-2x-4)=29 \Rightarrow 3x-10x-20=29 \Rightarrow -7x=49 \Rightarrow x=-7$

next page for e.

g. $\begin{cases} 5x - y = 3 \\ -10x + 2y = 2 \end{cases}$

S. $5x-3=y$ $-10x+2(5x-3)=2 \Rightarrow -10x+10x-6=2$, $-6=2$

no solution next page for e

h. $\begin{cases} \left(\frac{x}{2}-y=1\right)2 \\ \left(\frac{x}{5}+\frac{5y}{6}=\frac{14}{15}\right)30 \end{cases}$ $\Rightarrow \begin{cases} x-2y=2 \\ 6x+25y=28 \end{cases}$

next page for both.

2. A candy store sells chocolate-covered almonds for \$6.50 per pound and chocolate-covered peanuts for \$4.00 per pound. The manager decides to make a bridge mix that combines the almonds and the peanuts. She wants the bridge mix to sell for \$6.00 per pound. How many pounds of chocolate-covered almonds and chocolate-covered peanuts are required to create 50 pounds of bridge mix? Solve the system:

$$\begin{cases} a + p = 50 \\ 6.5a + 4p = 300 \end{cases} \quad)-4$$

$-4a-4p=-200$
$6.5a+4p=300$
$2.5a=100$
$\frac{2.5a}{2.5}=\frac{100}{2.5}$

$a=40$ lbs
$p=10$ lbs

1.c. $x+3y=-12$
$(-3x+y=0)\cdot 3$ $\Rightarrow$ $x+3y=-12$
$9x-3y=0$
$10x=-12$ $x=-6/5$ $\Rightarrow$ $y=3(-6/5)\Rightarrow y=-18/5$

1.d. $2x+4y=3$
$(3x-y=1)\cdot 4$ $\Rightarrow$ $2x+4y=3$
$12x-4y=4$
$14x=7$ $\Rightarrow x=1/2$ $3(1/2)-y=1\Rightarrow$
$y=1/2$

1.e. $2x+5y=15 \Rightarrow y=-\frac{3}{5}x+3$
$-6x-15(-\frac{3}{5}x+3)=-45 \Rightarrow -6x+6x-45=-45 \Rightarrow -45=-45$
dependent

1.f. $(2x+y=-4)\cdot(-5)$ $\Rightarrow$ $-10x-5y=20$
$3x+5y=29$
$-7x=49$ $x=-7$
$2(-7)+y=-4$
$-14+y=-4$
$y=10$

1.g. $(5x-y=3)\cdot 2$
$-10x+2y=2$ $\Rightarrow$ $10x-2y=6$
$-10x+2y=2$
$0=8$ no solution

1.h. 5. $x-2y=2 \Rightarrow x=2y+2$
$6x+25y=28 \Rightarrow 6(2y+2)+25y=28 \Rightarrow 12y+12+25y=28 \Rightarrow$
$\frac{37y}{37}=\frac{16}{37}$ $y=\frac{16}{37}$

$x=2(\frac{16}{37})+2 \Rightarrow$
$x=\frac{32}{37}+\frac{74}{37}=\frac{106}{37}$ $(\frac{106}{37},\frac{16}{37})$

E. $(x-2y=2)\cdot 25$
$(6x+25y=28)\cdot 2$ $\Rightarrow$ $25x-50y=50$
$12x+50y=56$
$37x=106$
$x=\frac{106}{37}$

$\frac{106}{37}-2y=2$
$\frac{-2y}{-2}=\frac{2-\frac{106}{37}}{-2}$
$y=-1+\frac{54}{37}=\frac{-37}{37}+\frac{54}{37}=$
$\frac{16}{37}$